REMARKS

Claims 14, 15, 17-20, 22, and 24-36 are all the claims pending in the application. Claims 14, 17, 18 and 24-36 stand rejected on prior art grounds. Claims 15, 19, 20 and 22 have been withdrawn from consideration. Applicant respectfully traverses these objections/rejections based on the following discussion.

I. The Prior Art Rejections

Claims 14, 17, 18, and 24-36 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Au et al., hereinafter "Au" (U.S. Patent No. 5,528,188), in view of Brady, et al., hereinafter "Brady" (U.S. Patent No. 5,314,841). Claims 24 and 26-30 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Ker et al., hereinafter "Ker" (5,631,793) in view of Au in view of Brady. Claim 25 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Ker, Au, and Brady. Applicant respectfully traverses this rejection based on the following discussion.

A. Summary of Claimed Subject Matter

Independent claims 14 and 31 similarly define a "body that is floating with respect to an underlying substrate " and "gate opposite said body" (item 45 in Figures 5 and 6), "an RC

discriminator comprising a resistor and a capacitor" (resistive transistor 42 and capacitor 41 in Figures 5 and 6), and "a circuit control network" (elements 44 and 60 in Figures 5 and 6). Independent claim 24 defines a similar structure, but is more specific to the structure shown in Figure 6 that has the "n-channel SOI MOSFET" and "p-channel SOI MOSFET" (items 43 in Figure 6), the "first" and "second" RC discriminators (items 41 and 42 in Figure 6), as well as the "first" and "second" circuit control networks (items 60 in Figure 6).

Applicant's FIG. 5 illustrates a PFET implementation, which operates as described above except, capacitor 41 and resistive transistor 42 initiate RC coupling of the gate 45. Element 44 acts as a voltage reference which limits the body potential to the reference voltage V_{ref}. In an ESD event, the RC network couples the gate 45 of the pass transistor 43. Similarly, FIG. 6 illustrates a PFET/NFET switch which includes RC networks 41, 42 which operate as described above. In addition, the structure in FIG. 6 includes body limiting devices 60 which limit the body voltage during functional operation. With the claimed invention, as shown in Figures 5 and 6, a pad 40, a capacitor 41, a pass transistor 43, a resistive transistor 42, and element 44, limits the voltage that the floating body can rise to and sets the reference voltage. The floating body 45 of the pass transistor 43 is connected to the input 40 by the RC network (e.g., resistive transistor (e.g., buried resistor) 42 and capacitor 41) such that when a pulsed event occurs (e.g., overvoltage, overcurrent), the voltage of the body 45 rises. This voltage rise of the body element 45 lowers the threshold voltage of the pass transistor 43, which causes the pass transistor 43 to turn on. In this state, the body 45 is dynamically coupled, thereby allowing a higher current drive, a lower turn-on voltage and at the same time, less voltage stress.

B. The Rejection Based on Au and Brady

i. Independent Claims 14 and 31

a. Lack of Prima Facie Case of Obviousness

The Office Action fails to set forth a prima face case of obviousness. More specifically, the Au reference does not disclose using the claimed "control circuit network" (which provides the electrostatic discharge protection described above) in a floating (silicon-over-insulator) structure. The Office Action argues that, because the Brady reference discloses that silicon-over-insulator structures are well-known, Au could have been used in a silicon-over-insulator structure.

Applicants have explained (and explain in detail below) why the circuit described in Au would not be operable in a silicon-over-insulator (SOI) structure. Briefly, Au discloses a SCR - a silicon controlled rectifier. SCR's require an N-well for their operation. Without an N-well, SCR's cannot operate. For this simple fact, SCR's cannot be fabricated using SOI technology because there is no N-well in SOI technology.

In response, the Office Action states that Au does not indicate that the SCR could not be used in SOI structures (Office Action, page 8, last line, page 9 first line). In other words, Applicants have demonstrated how the modified device proposed in the rejection is inoperable, and the Office Action has responded by noting that the applied reference does not state that it would be inoperable. This reasoning does not contradict or rebut Applicant's argument because most prior art reference do not discuss in which environments they do not work, but only discuss

environments in which they do work. Therefore, it would not be expected for the Au reference to explicitly state that it does not work with SOI environments and the lack of any such negative statement does not rebut the argument set forth by Applicants. Thus, the burden is still on the Office to set forth a prima facie case of obviousness (and provide an explanation how SCR's could be used in a SOI environment) especially after Applicants have demonstrated why such a modified structure would not be operable.

In addition, the Office Action states that the claims lack a negative limitation regarding the body not being connected to ground potential. Of course, the claims should define what the invention is, not what the invention is not, and therefore negative limitations are generally avoided. This limitation is positively recited by defining that the "body is floating with respect to the underlying substrate." One ordinarily skilled in the art would understand that a floating or SOI structure is not connected to ground potential. Therefore, contrary to the statements in the Office Action, the claimed features are presented as being novel in Applicants' arguments.

The circuit described in Au cannot be utilized in silicon-over-insulator (SOI) by stating that because the body of the transistor in Au is controlled by the control circuit 40, when the structure disclosed in Au is constructed using SOI technology, the control circuit 40 will still control the bias of the body. However, this reasoning does not contradict Applicant's previous explanation that the structure disclosed in Au cannot be constructed using SOI technology. Instead, the Office Action makes an incorrect presumption that the structure described in Au can be formed using SOI technology. Thus, where the Office Action argues ". . . when the circuitry in Au is fabricated by using SOI technology . . ." the Office Action presents an impossible

situation since the circuitry in Au cannot be fabricated using SOI technology. In other words, the argument that Au is properly combinable with Brady is based upon an incorrect presumption that the circuitry within Au can be fabricated using SOI technology (which, as discussed in greater detail below, is incorrect), and therefore, the arguments presented in the Office Action are defective because the teachings from Au cannot be applied to SOI technologies.

Au discloses a SCR - a silicon controlled rectifier (column 4, lines 40-44). More specifically, Au discloses a "low-voltage triggering silicon-controlled rectifier (LVTSCR)" (column 5, lines 5-8). SCR's require an N-well for their operation. Without an N-well, SCR's cannot operate. For this simple fact, SCR's cannot be fabricated using SOI technology because there is no N-well in SOI technology. Therefore, teachings regarding SCR's are simply irrelevant in technologies that utilize SOI.

More specifically, Au contains a PNPN device with a MOSFET that is electrically connected to an N-well and to ground in bulk Silicon (Au Figures 4a-4b). One cannot build a PNPN element in SOI technology because the body is floating with respect to the underlying substrate. A Low Voltage Trigger SCR cannot be built in SOI since LVTSCR circuits require use of a P+ diffusion in an N-well, a MOSFET connected to a well, a substrate region, and a n+ cathode. There is no N-well in SOI technology, hence, an SCR cannot be constructed in SOI. Hence, it would not be obvious to build an SCR in SOI. Au's circuit is electrically connected to the chip substrate. Au is not a triple well technology, and hence it cannot electrically connect to the substrate and have operability. Au also has a resistor, a capacitor, and a pad; however, as shown in Figure 4b of Au, a network exists between the pad 34 and ground potential. To the

contrary, with the claimed invention, because of the body is floating with respect to the underlying substrate, the pass transistor is not electrically connected to ground potential.

Therefore, Applicant respectfully submits that the proposed combination of Brady and Au is invalid, since a silicon controlled rectifier cannot be built using SOI technology. Thus, it is Applicant's position that a prima facie case of obviousness has not been set forth because, in this instance, Brady is not properly combinable with Au.

If the device in Au were transferred to the SOI technology field, this would destroy the operability of the device in Au because Au relies on the body being non-floating. When the proposed combination of references destroys the operability of one of the references, this indicates that the proposed combination would not have been made by one ordinarily skilled in the art.

Non-SOI structures do not insulate the body from the underlying substrate, while in SOI structures the body is insulated (floating). The technologies with respect to the body potential are fundamentally different, and teachings relating to bodies of non-SOI structures generally cannot be transferred to the floating bodies of SOI structures because of the fundamental difference regarding the body potential. While SOI technologies present substantial advantages over non-SOI technologies (because of the floating body) SOI technologies also present a number of impediments which were not present in non-SOI technologies (also because the body is floating). Generally non-SOI technologies cannot be transferred to SOI technologies. Therefore, simply referring to Brady as disclosing an SOI structure and then concluding that all the non-SOI teachings in Au can readily apply to an SOI structure is not reasonable given that the structure in

Au must be modified significantly in order to be functional within the SOI technology environment. Indeed, simply transferring the structure shown in Au to an SOI environment would render the operation of the device in Au non-functional because Au relies upon the body being non-floating in order to have the device properly operate. Thus, because the proposed combination destroys the operability of the Au reference, Applicant submits that a prima facie case of obviousness has not been set forth. This is especially true considering that the claimed invention is directed toward solving problems associated with the potential of the floating body which is a problem unique to SOI structures.

b. No Teaching of the Claimed Invention

The proposed combination does not teach or suggest the "circuit control network connected to said body, said circuit control network modulating a potential voltage of said body to provide electrostatic discharge (ESD) protection" where the body "is floating with respect to an underlying substrate." Because it is improper to modify the Au reference (as shown above) there in no teaching of such features defined by independent claim 1 and 31. Therefore, independent claims 1 and 31 are patentable over the prior art of record and, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 14 and 31.

ii. Dependent Claims 17, 18, and 32-36

As shown above independent claims 14 and 31 are patentable over the prior art of record. Further, dependent claims 17, 18, and 32-36 are similarly patentable, not only because they depend from a patentable claim, but also because of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 17, 18, and 32-36.

B. The Rejection Based on Ker in view of Au and Brady

i. Independent Claim 24

a. Lack of Prima Facie Case of Obviousness

The Office Action fails to set forth a prima face case of obviousness. More specifically, the Au reference does not disclose using the claimed "control circuit network" (which provides the electrostatic discharge protection described above) in a floating (silicon-over-insulator) structure. The Office Action argues that, because the Brady reference discloses that silicon-over-insulator structures are well-known, Au could have been used in a silicon-over-insulator structure.

Applicants have explained (and explain in detail below) why the circuit described in Au would not be operable in a silicon-over-insulator (SOI) structure. Briefly, Au discloses a SCR - a silicon controlled rectifier. SCR's require an N-well for their operation. Without an N-well, SCR's cannot operate. For this simple fact, SCR's cannot be fabricated using SOI technology because there is no N-well in SOI technology.

In response, the Office Action states that this argument is not persuasive because Au does not indicate that the SCR could not be used in SOI structures (Office Action, page 8, last line, page 9 first line). In other words, Applicants have demonstrated how the device proposed in the rejection is inoperable, and the Office Action has responded by noting that the applied reference does not state that it would be inoperable. This reasoning does not contradict or rebut Applicant's argument because most prior art reference do not discuss in which environments they do not work, but only discuss environments in which they do work. Therefore, it would not be expected for the Au reference to explicitly state that it does not work with SOI environments and the lack of any such negative statement does not rebut the argument set forth by Applicants. Thus, the burden is still on the Office to set forth a prima facie case of obviousness (and provide an explanation how SCR's could be used in a SOI environment) especially after Applicants have demonstrated why such a modified structure would not be operable.

Further, Brady is not properly combinable with Au or Ker. The Office Action proposes to combine Brady with Au and Ker to show that the technology within Au and Ker could be extended to SOI technology. However, this combination is not reasonable given that the invention is directed toward controlling the body potential of an SOI transistor and that the

teachings of non-SOI technologies are not generally transferable to the floating bodies of SOI structures. Further, as described in detail below, if the devices in Au and Ker were transferred to the SOI technology field, this would destroy the operability of the devices in Au and Ker because Au and Ker rely on the body being non-floating. When the proposed combination of references destroys the operability of one of the references, this indicates that the proposed combination would not have been made by one ordinarily skilled in the art.

As pointed out above, non-SOI structures do not insulate the body from the underlying substrate, while in SOI structures the body is insulated (floating). The technologies with respect to the body potential are fundamentally different, and teachings relating to bodies of non-SOI structures generally cannot be transferred to the floating bodies of SOI structures because of the fundamental difference regarding the body potential. While SOI technologies present substantial advantages over non-SOI technologies (because of the floating body) SOI technologies also present a number of impediments which were not present in non-SOI technologies (also because the body is floating). Generally, non-SOI technologies cannot be transferred to SOI technologies, unless compensation is made for the floating body. Therefore, simply referring to Brady as disclosing an SOI structure and then concluding that all the non-SOI teachings in Au and Ker can readily apply to an SOI structure is not reasonable given that the structures in Au and Ker must be modified significantly in order to be functional within the SOI technology environment. Indeed, simply transferring the structures shown in Au and Ker to an SOI environment would render the operation of the devices in Au and Ker non-functional because Au and Ker rely upon the body being non-floating in order to have the devices properly operate. Thus, because the

proposed combination destroys the operability of the Au and Ker references, Applicant's submit that a prima facie case of obviousness has not been set forth. This is especially true considering that the claimed invention is directed toward solving problems associated with the potential of the floating body which is a problem unique to SOI structures.

As shown above, Au and Ker are not properly combinable with Brady. There is nothing within Ker or Au that would have suggested to one ordinarily skilled in the art that they should combine Brady with Au and/or Ker. Therefore, this rejection is similarly defective as the previous rejection in that a prima facie case of obviousness has not been set forth. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 24.

b. No Teaching of the Claimed Invention

The proposed combination does not teach or suggest the "circuit control network connected to said body" where the "circuit control network modulating a potential voltage of said [first/second] body to provide electrostatic discharge (ESD) protection" where the body "is floating with respect to an underlying substrate." Because it is improper to modify the Au reference (as shown above) there in no teaching of such features defined by independent claim 24. Therefore, independent claim 24 is patentable over the prior art of record and, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 24.

ii. Dependent Claims 26-30

As shown above independent claim 24 is patentable over the prior art of record. Further, dependent claims 26-30 are similarly patentable, not only because they depend from a patentable claim, but also because of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 26-30.

C. The Rejection Based on Ker in view of Au and Brady

The Examiner combines Ker with Au. The examiner admits that Ker does not disclose the device a first circuit control network, nor a second control network that discloses a second device. One cannot combine Ker with Au and Brady, since Au is a SCR for switching an SCR, and Ker is bulk CMOS, and Brady is SOI. One cannot map the solution of Au into Ker and Brady, since it would not be operable nor possible to design and implement. Hence it would not be obvious to combine Ker, Brady and Au. Further, Sasaki uses an RC network which is connected to a pad, a resistor, a capacitor and this is electrically connected to the gate of a MOSFET between the pad and ground potential. Thus, Sasaki teaches gate modulation and not body modulation.

As shown above, Au and Ker are not properly combinable with Brady. The Office Action makes reference to Sasaki for the limited purpose of disclosing a resistive transistor and there is nothing within Sasaki that would have suggested to one ordinarily skilled in the art that they should combine Brady and Au and Ker. Therefore, this rejection is similarly defective as the previous rejection in that a prima facie case of obviousness has not been set forth. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejection of claim 25.

II. Formal Matters and Conclusion

In view of the foregoing, Applicant submits that claims 14, 15, 17-20, and 22, and 24-36, all the claims presently pending in the application. Claims 14, 17, 18 and 24-36 are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary.

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Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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